U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator

1200 New Jersey Ave., SE
Washington, D.C. 20590

July 29, 2021

The Honorable Patrick J. Leahy
Chairman
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Chairman Leahy:

This letter provides the report requested in Senate Report 116-109 accompanying the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2020. The Senate Report requested that the Federal Highway Administration (FHWA) "determine the best available estimate of the total amount of non-highway recreational fuel taxes received by the Secretary of the Treasury and transferred to the Highway Trust Fund during the previous three fiscal years."

The report describes the process currently used to determine non-highway use of gasoline in recreational vehicles and corresponding amount of taxes received over the past three fiscal years. The current process leverages data collected annually to determine the amount of fuel used for non-highway purposes, which includes construction equipment, agricultural vehicles, watercraft, and other non-highway applications in addition to recreational vehicle use. The estimate of the total amount of non-highway recreational fuel taxes can be calculated by multiplying the estimated gallons of fuel used for non-highway purposes by the prevailing tax rate.

The estimation of use is based on a model created by the Oak Ridge National Laboratory, which includes a series of inputs from external data sources, including industry data on the number of vehicles by type (motorcycles, light duty trucks, all-terrain vehicles, and snowmobiles) and State-specific measures of rural and Federal lands.

The FHWA's current process for estimating non-highway use of gasoline by recreational vehicles provides reasonable estimates of non-highway use of recreational vehicles. Using the model for the past 3 years for which data is available, the estimated amount of taxes on non-highway use of recreational vehicles is $843,422,069 (average of $281,140,690/year). The annual funding amount authorized by the Fixing America's Surface Transportation Act for the Recreational Trails program is approximately $84 million[1]. Based on recent years, the funding for the Recreational Trails program, is approximately 0.2 percent of the revenue into the highway trust fund, and about 0.3 percent of the fuel tax revenue contributions to the Highway Trust Fund. The model is flexible and could be adjusted to account for variables such as the number of vehicles and available recreational land. The model also could be adjusted to include additional vehicle types, or the use of various fuels, which may be taxed at different rates, and thus produce different amounts of revenue.

[1] States have an opportunity to opt out of the program, which could result in a lower level of actual funding in any given fiscal year. For example, in FY 2021, Connecticut and Indiana opted out, reducing the actual funding level toapproximately $82 million.

I have sent a similar letter to the Vice Chairman of the Senate Committee on Appropriations; the Chair and Ranking Member of the House Committee on Appropriations; the Chairman and Ranking Member of the Senate Subcommittee on Transportation, Housing and Urban Development, and Related Agencies; and the Chairman and Ranking Member of the House Subcommittee on Transportation, Housing and Urban Development, and Related Agencies.

Sincerely,

Stephanie Pollack
Acting Administrator

Enclosure

Methodology to Estimate Non-Highway Recreational Fuel Taxes CY 2016 – 2018

Note on Estimates

While the request was for an estimation of the revenue from non-highway use of recreational vehicles from the last 3 fiscal years, the collection of information is done on a calendar year basis, and thus the estimates provided in this report represent full calendar years.

Executive Summary

Senate Report 116-109 accompanying the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2020, requested that the Federal Highway Administration (FHWA) "determine the best available estimate of the total amount of non-highway recreational fuel taxes received by the Secretary of the Treasury and transferred to the Highway Trust Fund (HTF) during the previous 3 fiscal years."

Using the model for the past 3 years for which data are available, the estimated amount of taxes on non-highway use of recreational vehicles is $843,422,069 (average of $281,140,690/year). The annual funding amount provided by the Fixing America's Surface Transportation Act for the Recreational Trails program is approximately $84 million.

The current process for estimating the non-highway use of fuel in recreational vehicles, coupled with additional analysis, can be used for determining the amount of taxes received by the Secretary of the Treasury for such vehicles. The current process computes the use in gallons, which is then multiplied by the prevailing fuel tax rate to arriveat the estimate of revenues.

As part of annual data collection, States report all gallons of fuel distributed. The FHWA uses this as an input into a model that estimates the amount of fuel used (in gallons) and the amount of non-highway use. The estimated gallons of fuel used on highways are then derived to determine the taxable amount of fuel distributed.

The current process used by FHWA to determine non-highway use of gasoline includes estimations for several types of fuel use for non-highway purposes. The model includes a separate category for off-road recreational vehicle fuel use. While it may be possible to estimate off-road recreational vehicle fuel use for non-gasoline fuels, FHWA does not believe that a significant amount of taxable non-gasoline fuels is used in off-road recreational vehicles. Rather, it is more likely that non-gasoline fuels used in such vehicles are not taxed and, therefore, their use would not greatly impact the estimated taxes received and transferred to the HTF.

Request for Report

Senate Report 116-109 accompanying the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2020, included the following language:

> *Non-Highway Recreational Fuel Taxes--In an effort to better inform Federal-aid highway formula funding levels for the Recreational Trails Program, the Committee directs FHWA to determine the best available estimate of the total amount of non-highway recreational fuel taxes received by the Secretary of the Treasury and transferred to the Highway Trust Fund during the previous three fiscal years. For this purpose, "non-highway recreational fuel taxes" means taxes under sections 4041 and 4081 of the Internal Revenue Code of 1986 with respect to fuel used in vehicles on recreational trails or back-country terrain, as well as evaluate whether the current Recreational Trails Program funding level reflects the amount of non-highway recreational fuel taxes collected and transferred to the Highway Trust Fund. FHWA shall report on its finding tothe House and Senate Committees on Appropriations within 1 year of the date of enactment of this act.*

Introduction/Background

This report is prepared as a response to Senate Report 116-109 and addresses the current methods used by FHWA to collect and model data to estimate the amount of gasoline used in recreational vehicles used in non-highway operations.

This report discusses a method for estimating the fuel taxes received using a model to estimate the amount of gasoline used in the non-highway operation of recreational vehicles. It is important to note that the revenues transferred from the U.S. Treasury to the HTF do not differentiate between those generated from highway-based gasoline use and non-highway-based gasoline use, hence the need for the application of this model. While the current model estimates are based on gallons of gasoline used, the corresponding revenue can be estimated by applying the Federal excise tax rate on gasoline.

For many years, the FHWA has been charged with computing an amount of motor fuel used on highways, as the related revenues serve as an input to determining the apportionment of Federal-aid highway program funds to the States. Gasoline, when distributed from a bulk terminal, usually includes a levy of Federal and State excise taxes. While non-highway use of gasoline is generally eligible for refund of excise taxes paid, it is believed that very limited claims would be filed for recreational fuel use. Excise Taxes on diesel, also referred to as Special Fuel (which includes Kerosene and certain other blends), are not included when the fuel is removed from the bulk terminal if it includes a red dye, which is specified for non-highway use. Undyed diesel has the Federal and State excise taxes included.

States do not collect data on non-highway use in a uniform manner, so the FHWA currently uses a model to estimate the non-highway use of gasoline in various types of vehicles and equipment to arrive at the total number of gallons used on the highways in each State. FHWA uses information provided by the States to compute total fuel consumed, and then subtracts the non-highway estimates to arrive at fuel used on highways. These estimates are then used to calculate excise tax revenue for on-highway fuel consumption, by subtracting the revenue associated with the model's calculation of off-highway consumption.

The HTF receives revenue transferred from the U.S. Treasury and includes excise tax on motor fuel, and three taxes levied on heavy vehicles, including the Heavy Vehicle Use Tax, Truck and Trailer Tax, and Tire Tax. Excise taxes on motor fuel make up about 85 percent of the revenue transferred into the HTF each year.

Current Methodology

The FHWA uses a model to estimate the non-highway use in each State. An exact figure for each State is not possible because not all States have refund information for non-highway use. The FHWA contracted with the Oak Ridge National Laboratories (ORNL) to calibrate the off-highway fuel model. The current model was created in 1993 and most recently calibrated in 2015.

The model uses several inputs and can incorporate input from sources outside of FHWA as needed. The non-highway use of fuel computed for apportionment and annual reporting purposes is based only on gasoline. It is assumed that any non-highway use of special fuel will be with the use of the dyed, and thus, non-taxed fuel.

The following sections are taken from the documentation in the current estimation process used to annually calculate the non-highway recreational vehicle fuel use. At the end of the document are two attachments. The first is an excerpt of the Excel worksheet used to compute the non-highway recreational vehicle gasoline use. The second is a sample estimate of revenue into the HTF by State (2016 – 2018) based on model outputs computed with the prevailing Federal fuel tax rate on gasoline during those years (18.4 cents per gallon).

Data sources

Generally, fuel use estimates in this model rely on the population of vehicles within a State and estimated average annual fuel used per vehicle, including an estimated proportion of off-road use. State shares were adjusted by a rural land factor in the State, to address use of a vehicle outside its registered State. A brief discussion of the data sources and estimation procedures are provided below.[2]

Each year, FHWA produces a series of tables and charts that are published on the Highway Statistics website.[3] The Highway Statistics Series consists of annual reports containing analyzed statistical information on motor fuel, motor vehicle registrations, driver licenses, highway user taxation, highway mileage, travel, and highway finance. This information is presented in tables. Selected tables from the Highway Statistics publication provide light duty truck-related data for the off-road recreational vehicle model, including Table MV-9 (light duty truck and truck-tractor registrations), Table MV-1 (State motor-vehicle registrations), and Table PS-1 (Selected measures for identifying peer states).

In addition to data sources used for light duty truck related fuel uses for recreational purposes, motorcycle and all-terrain vehicle (ATV) information and statistics are based on estimates produced by the Motorcycle Industry Council (MIC) and published in the *Motorcycle Statistical Annual.* Certain information from the Department of Motor Vehicles (DMV) in several States also is used to derive the ATV fuel usage by State produced from the 1999 study. For snowmobiles, this model uses registration data obtained from International Snowmobile Manufacturers Association (ISMA), American Council of Snowmobile Associations (ACSA), and other State agencies (e.g., DMVs).

Estimation model

Data sources utilized in this off-road recreational vehicle model vary among vehicle types. The off-road recreational vehicle model is comprised of information relating to: off-highway light duty trucks, off-highway motorcycles, ATVs, and snowmobiles. Thus, different estimation procedures are applied to obtain vehicle type specific fuel consumption estimates. Below is a summary of the estimation methods.

[2] Hwang, H., Yang, J, Wilson, D., Taylor, R., and Chin, S. Off-Highway and Public-Use Gasoline Consumption Estimation Models Used in the Federal Highway Administration. Office of Highway Policy Information, U.S. Department of Transportation, 2015

[3] FHWA Highway Statistics - https://www.fhwa.dot.gov/policyinformation/statistics.cfm

Category	
Data Sources	**Calculation Methods**
Light Duty Trucks	
States report number of vehicles by type on annual reports which are summarized on the MV-9 table on the Highway Statistics site.	The fuel consumption by light duty trucks – which includes pick-up trucks and sport utility vehicles (SUVs) – for off-road recreational purposes can be estimated using the number of off-road recreational use light duty trucks, with information about the fuel economy (i.e., miles-per-gallon (MPG)) and the average annual miles traveled (i.e., vehicle miles traveled (VMT)) per truck. Both MPG and VMT information are based on statistics published in the annual Highway Statistics Table VM-1. Multiplying the estimated annual gallons of fuel used per truck in each State by the total number of off-road recreational light duty trucks for the given State estimates the fuel use for light duty trucks used in off-road recreation by State.
Note: The estimation procedure assumed that all light duty trucks are registered.	

Category	
Data Sources	**Calculation Methods**
Motorcycles	
The MIC represents manufacturers and distributors of motorcycles, scooters, and ATVs as well as members of allied trades. The MIC conducts periodic surveys of equipment owners to determine usage characteristics. Information collected from the MIC survey is proprietary and the results are confidential. However, the MIC publishes an annual statistical report, the *Motorcycle Statistical Annual*, which contains motorcycle industry statistics and proprietary information.	The FHWA's current off-road recreational vehicle model relies on annual estimates of the number of motorcycles published in the *Motorcycle Statistical Annual* and the proportion of motorcycles used for off-road estimated by MIC to produce the estimated number of off-road recreational motorcycles. The ORNL derived low, medium, and high values for average annual fuel use per motorcycle from that research effort. It was recommended, based on that study, the "medium" estimate of 59 gallons per motorcycle per year should be used in estimating off-road recreational motorcycle fuel use for each State, until more precise data on average annual fuel use of off-road motorcycles are collected.
Note: The MIC was contacted during this report's preparation to confirm that its data would be available in the foreseeable future.	
All-Terrain Vehicles	
An ATV is a three- or four-wheeled motorized vehicle designed for off-road use. The MIC also includes ATVs in some of its survey data collection efforts. This inclusion of ATVs in MIC surveys, however, appears to be done only periodically. The current FHWA off-road recreational vehicle model assumes the numbers of ATVs by State as provided by the MIC are all used off-road. Based on MIC estimate procedures, the number of ATVs was computed from the annual retailer sales in conjunction with the vehicle scrappage rates.	The current model uses percent of recreational uses of these ATVs estimated based on information from the U.S. Consumer Product Safety Commission, which indicated about 74 percent of ATV drivers used ATVs for at least one non-recreational activity in 1997 (e.g., farming or ranching). Like motorcycles, the "medium" estimate of 55.5 gallons per ATV per year was used to estimate off-road recreational ATV fuel consumption by State.

Category	
Data Sources	**Calculation Methods**
Snowmobiles	
For most States, the numbers of registered snowmobiles are obtained from ISMA. However, ACSA and ISMA only gather data for States that have snowmobile associations participating in international events, thus some States (e.g., Connecticut, Delaware, Maryland, New Jersey, New Mexico and Rhode Island) are not included. The snowmobile counts for these States are obtained from other data source such as State DMVs. In addition, the number of snowmobiles for Arizona and Nevada used in the current FHWA off-road recreational vehicle model was estimated based on State survey data and associated estimates of growth rates. Furthermore, the estimation of the number of snowmobiles in Alaska followed guidelines provided by ISMA. Per ISMA, the number of unregistered, usable snowmobiles in the U.S. is no more than 5 percent of the total number of snowmobiles in any State that has registration data. Thus, the number of snowmobiles in each State (except for Alaska and Arizona) is increased by 5 percent to adjust for unregistered usable snowmobiles. As snowmobiles can only travel when there is snow on the ground, a snow factor categorizing temperature and snowfall is also used to adjust the number of snowmobiles in each State.	During the process to estimate fuel consumption by snowmobiles, it was assumed that all snowmobiles are used exclusively off-road. Per ISMA, snowmobiles are used 80 percent of the time for "typical" recreation, about 15 percent for ice fishing and about 5 percent for work purposes. In the current FHWA off-road recreational vehicle model, off-road recreational fuel consumption includes fuel used for "typical" recreation and ice fishing. For the annual fuel usage, ISMA estimates that the average snowmobiler uses about 101 gallons annually for "typical" off-road recreational purposes and 13.3 gallons annually for ice fishing. Statewide annual fuel use for "typical" recreational purpose and ice fishing is generated by multiplying the number of snowmobiles for each State by the percentage use time and its corresponding annual fuel usage. The total snowmobile off-road recreational fuel use is the sum of these two estimates.

Final Adjustment of Estimates

Since the availability of rural land is a proxy for opportunity to participate in off-road recreational activities, the estimated gasoline usage for each State was adjusted by this rural land factor to finalize the results produced from the FHWA off-road recreational vehicle model.

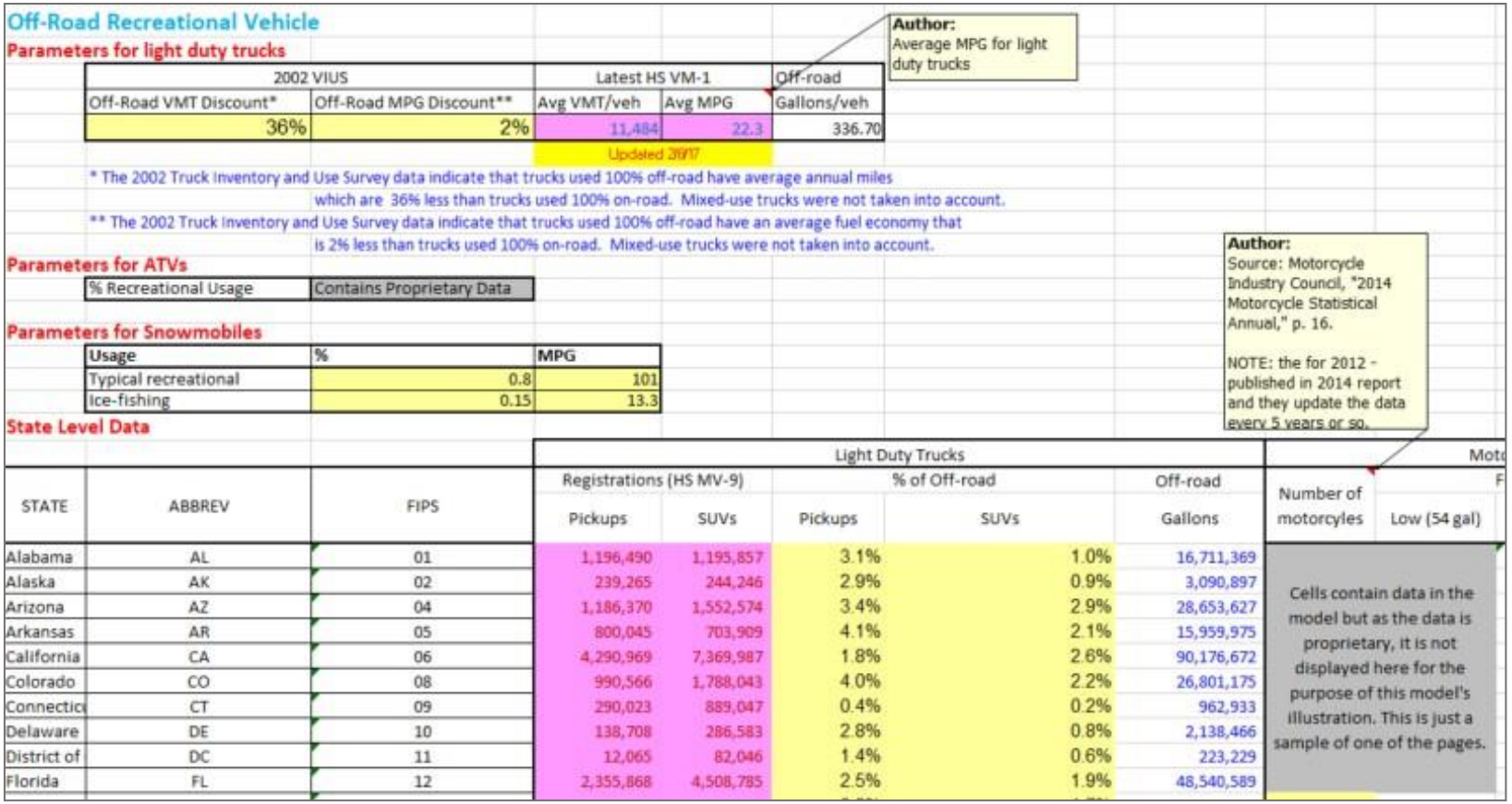
Conclusions

The FHWA's current process for estimating non-highway use of gasoline by recreational vehicles provides reasonable estimates of non-highway use of recreational vehicles. This model, like any other model, will need to be reviewed and updated to account for new or changing data sources. Other inputs (e.g. population, inflation, income) may also need to be considered to refine accuracy. The current process appears adequate for determining the gasoline used in non-highway recreational vehicles. The data is collected and computed in gallons; however, the table in Attachment B converts the computed gallons into revenue estimates. Using the model for the past 3 years for which data is available, the estimated amount of taxes on non-highway use of recreational vehicles is $843,422,069 (average of $281,140,690/year). The annual funding amount provided by the Fixing America's Surface Transportation Act for the Recreational Trails program is approximately $84 million[4].

[4] States have an opportunity to opt out of the program, which could result in a lower level of actual funding in any given fiscal year. For example, in FY 2021, Connecticut and Indiana opted out, reducing the actual funding level to approximately $82 million.

Attachment A: Excerpt of Worksheet used for determining non-highway use of certain recreational vehicles.

Note: Due to the layout of the worksheet, it would be difficult to display the entire page, but in the section of the table with the State amounts, there are separate computations for Light Duty Trucks, Motorcycles, ATVs, and Snowmobiles.



Off-Road Recreational Vehicle

Parameters for light duty trucks

2002 VIUS		Latest HS VM-1		Off-road
Off-Road VMT Discount*	Off-Road MPG Discount**	Avg VMT/veh	Avg MPG	Gallons/veh
36%	2%	11,484	22.3	336.70

Updated 2017

* The 2002 Truck Inventory and Use Survey data indicate that trucks used 100% off-road have average annual miles which are 36% less than trucks used 100% on-road. Mixed-use trucks were not taken into account.

** The 2002 Truck Inventory and Use Survey data indicate that trucks used 100% off-road have an average fuel economy that is 2% less than trucks used 100% on-road. Mixed-use trucks were not taken into account.

Author: Average MPG for light duty trucks

Parameters for ATVs

% Recreational Usage	Contains Proprietary Data

Parameters for Snowmobiles

Usage	%	MPG
Typical recreational	0.8	101
Ice-fishing	0.15	13.3

Author: Source: Motorcycle Industry Council, "2014 Motorcycle Statistical Annual," p. 16.

NOTE: the for 2012 - published in 2014 report and they update the data every 5 years or so.

State Level Data

			Light Duty Trucks					Moto	F
			Registrations (HS MV-9)		% of Off-road		Off-road	Number of motorcyles	Low (54 gal)
STATE	ABBREV	FIPS	Pickups	SUVs	Pickups	SUVs	Gallons		
Alabama	AL	01	1,196,490	1,195,857	3.1%	1.0%	16,711,369		
Alaska	AK	02	239,265	244,246	2.9%	0.9%	3,090,897		
Arizona	AZ	04	1,186,370	1,552,574	3.4%	2.9%	28,653,627		
Arkansas	AR	05	800,045	703,909	4.1%	2.1%	15,959,975		
California	CA	06	4,290,969	7,369,987	1.8%	2.6%	90,176,672		
Colorado	CO	08	990,566	1,788,043	4.0%	2.2%	26,801,175		
Connecticu	CT	09	290,023	889,047	0.4%	0.2%	962,933		
Delaware	DE	10	138,708	286,583	2.8%	0.8%	2,138,466		
District of	DC	11	12,065	82,046	1.4%	0.6%	223,229		
Florida	FL	12	2,355,868	4,508,785	2.5%	1.9%	48,540,589		

Cells contain data in the model but as the data is proprietary, it is not displayed here for the purpose of this model's illustration. This is just a sample of one of the pages.

Attachment B: Estimates of Non-Highway Use of Recreational Vehicles 2016 to 2018

State	2016		2017		2018	
	Gallons (in thousands)	Revenue	Gallons (in thousands)	Revenue	Gallons (in thousands)	Revenue
Alabama	32,494	5,978,896	28,877	5,313,385	30,651	5,639,810
Alaska	21,956	4,039,904	21,520	3,959,667	21,964	4,041,430
Arkansas	44,872	8,256,448	41,405	7,618,483	49,061	9,027,239
Arizona	29,681	5,461,304	27,996	5,151,198	30,087	5,536,041
California	159,123	29,278,632	145,278	26,731,099	167,257	30,775,208
Colorado	44,572	8,201,248	40,727	7,493,736	47,281	8,699,676
Connecticut	4,227	777,768	4,114	756,908	4,272	786,007
Delaware	2,955	543,720	2,724	501,157	3,031	557,668
District of Columbia	301	55,384	281	51,694	329	60,622
Florida	68,725	12,645,400	62,435	11,488,029	73,876	13,593,149
Georgia	33,138	6,097,392	31,452	5,787,132	34,663	6,378,012
Hawaii	5,768	1,061,312	5,942	1,093,289	5,963	1,097,254
Idaho	32,627	6,003,368	29,699	5,464,621	32,965	6,065,610
Indiana	25,028	4,605,152	23,933	4,403,593	25,551	4,701,331
Illinois	21,255	3,910,920	20,125	3,702,976	21,657	3,984,912
Iowa	19,871	3,656,264	18,652	3,432,031	20,179	3,712,944
Kansas	19,189	3,530,776	17,103	3,146,961	19,759	3,635,597
Kentucky	25,175	4,632,200	24,062	4,427,368	25,871	4,760,341
Louisiana	25,285	4,652,440	24,135	4,440,828	25,004	4,600,697
Maine	17,519	3,223,496	17,424	3,205,959	17,616	3,241,407
Maryland	9,693	1,783,512	9,091	1,672,831	10,233	1,882,905
Massachusetts	11,842	2,178,928	11,009	2,025,633	12,436	2,288,283
Michigan	50,554	9,301,936	48,332	8,893,008	51,861	9,542,389
Minnesota	54,726	10,069,584	52,937	9,740,455	55,897	10,285,017
Mississippi	22,115	4,069,160	21,018	3,867,390	21,890	4,027,729
Missouri	31,745	5,841,080	29,352	5,400,678	31,880	5,865,908
Montana	33,664	6,194,176	30,657	5,640,896	35,785	6,584,425
Nebraska	14,802	2,723,568	13,456	2,475,868	14,469	2,662,273
Nevada	26,971	4,962,664	24,748	4,553,670	28,706	5,281,863
New Hampshire	12,936	2,380,224	12,408	2,283,058	13,286	2,444,631
New Jersey	12,977	2,387,768	13,225	2,433,485	13,626	2,507,192
New Mexico	22,138	4,073,392	21,424	3,942,091	21,558	3,966,712
New York	55,505	10,212,920	53,577	9,858,236	57,466	10,573,666
North Carolina	32,919	6,057,096	31,399	5,777,350	33,581	6,178,819
North Dakota	10,732	1,974,688	9,794	1,802,096	11,958	2,200,255
Ohio	29,127	5,359,368	28,026	5,156,713	29,354	5,401,186
Oklahoma	28,141	5,177,944	32,146	5,914,822	34,898	6,421,206
Oregon	28,167	5,182,728	25,877	4,761,404	31,680	5,829,142
Pennsylvania	44,668	8,218,912	42,351	7,792,505	45,818	8,430,470
Rhode Island	1,381	254,104	1,286	236,675	1,446	265,988
South Carolina	15,336	2,821,824	14,328	2,636,351	15,910	2,927,410
South Dakota	12,974	2,387,216	11,585	2,131,645	14,561	2,679,241
Tennessee	32,248	5,933,632	30,229	5,562,160	33,627	6,187,302
Texas	124,055	22,826,120	110,838	20,394,169	125,550	23,101,246
Utah	23,242	4,276,528	22,014	4,050,588	24,258	4,463,500
Vermont	5,116	941,344	5,001	920,144	5,074	933,529
Virginia	29,214	5,375,376	27,280	5,019,472	30,969	5,698,363
Washington	37,387	6,879,208	33,911	6,239,680	40,766	7,501,036
West Virginia	20,668	3,802,912	19,099	3,514,153	21,397	3,936,971
Wisconsin	49,132	9,040,288	47,482	8,736,690	50,168	9,230,865
Wyoming	22,790	4,193,360	21,390	3,935,814	22,794	4,194,165
Totals	**1,540,726**	**$ 283,493,584**	**1,443,151**	**$ 265,539,845**	**1,599,938**	**$ 294,388,640**